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PART III:

ENVIRONMENTAL PROTECTION AGENCY

Emission Monitoring Requirements

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RECEIPT OF APPLICATION AND APPROVAL OF ALTERNATIVE MONITORING REQUIREMENTS

ENVIRONMENTAL PROTECTION AGENCY

[FRL 628-3]

EMISSION MONITORING REQUIREMENTS

Receipt of Application and Approval of Alternative Monitoring Requirements

On October 6, 1975 (40 FR 46247 and 46256), and on August 20, 1976 (41 FR 35185) the Environmental Protection Agency (EPA) promulgated regulations under 40 CFR Parts 51 and 60 which require continuous emission monitoring of sulfur dioxide and oxides of nitrogen at new and certain existing fossil fuel-fired steam generators. The regulations require that the emission rate be computed using an equation which requires the measurement of the pollutant concentration and percent oxygen in the stack gas on a dry basis only. However, paragraph 3.9.1 of Appendix P to 40 CFR Part 51 and § 60.13(i)(3) of 40 CFR Part 60 provide for application for approval of "alternative monitoring requirements to accommodate continuous monitoring systems that require additional measurements to correct for stack moisture conditions."

EPA has received two written applications for approval of alternative monitoring requirements; one was received from Lear Siegler, Incorporated, Englewood, Colorado, on January 9, 1976, and one from E. I. duPont de Nemours and Company, Wilmington, Delaware, on January 23, 1976. Specifically, the applicants requested approval of alternative emission data reduction procedures to be used with wet-basis stack gas pollutant and oxygen monitoring data from fossil fuel-fired steam generators. EPA has completed a technical review of the applications and approves the following alternative data reduction procedures using wet-basis pollutant and oxygen data for new stationary sources regulated by 40 CFR Part 60. State control agencies may include these data reduction techniques in their Implementation Plans.

a. The following equation may be used for the determination of sulfur dioxide and oxides of nitrogen emissions from fossil fuel-fired steam generators when the pollutant and oxygen concentrations are measured on a wet basis except where wet scrubbers are employed, or where moisure is otherwise added to the stack gases:

$$E = C_{ws} F_w \left(\frac{20.9}{20.9\ (1 - B_{ws}) - \%O_{2ws}} \right)$$

where:

1. E=pollutant emission, g/million cal (lb/million Btu).

2. C_{ws}=pollutant concentration at stack conditions, g/wscm (grams/wet standard cubic meter) (lb/wscf (pounds/wet standard cubic foot)), determined by multiplying the average concentration (ppm) for each one-hour period by 4.15×10^{-5} M g/wscm per ppm (2.59×10^{-9} M lb/wscf per ppm) where M-pollutant molecular weight, g/g-mole (lb/lb-mole). M=64.07 for sulfur dioxide and 46.01 for nitrogen oxides.

3. $\%O_{2ws}$=oxygen volume (expressed as percent—wet-basis determined with equipment specified under paragraph (d) of section 60.45.

4. F_w=a factor representing a ratio of the volume of wet flue gases generated to the calorific value of the fuel combusted. Values of F_w are given as follows:

(i) For anthracite coal as classified according to A.S.T.M. D388-66, F_w=1.188 wscm/million cal (10580 wscf/million Btu).

(ii) For sub-bituminous and bituminous coal as classified according to A.S.T.M. D388-66, F_w=1.200 wscm/million cal (10680 wscf/million Btu).

(iii) For liquid fossil fuels including crude, residual, and distillate oils, F_w=1.164 wscm/million cal (10360 wscf/million Btu).

(iv) For gaseous fossil fuels: For natural gas, F_w=1.196 wscm/million cal (10650 wscf/million Btu). For propane, F_w=1.150 wscm/million cal (10240 wscf/million Btu). For butane, F_w=1.172 wscm/million cal (10430 wscf/million Btu).

Values of F_w may be determined from a fuel analysis as follows:

$$F_w = \frac{347.4\ \%H + 95.7\ \%C + 35.4\ \%S + 8.6\ \%N - 28.5\ \%O + 13.4\ \%H_2O^1}{GCV_w} \quad \text{(Metric)}$$

$$F_w = \frac{10^6\ [5.56\ \%H + 1.53\ \%C + 0.57\ \%S + 0.14\ \%N - 0.46\ \%O + 0.21\ \%H_2O^1]}{GCV_w} \quad \text{(English)}$$

[1] This term may be omitted if %H+%O includes the unavailable hydrogen and oxygen in the form of H_2O.

where:

H, C, S, N, and O are content by weight of hydrogen, carbon, sulfur, nitrogen, and oxygen (expressed as percent), respectively, as determined on the same basis as GCV_w by ultimate analysis of the fuel fired, using A.S.T.M. method D3178-74 or D3176 (solid fuels), or computed from results using A.S.T.M. methods D1137-53(70), D1945-64 (73), or D1946-67(72) (gaseous fuels) as applicable.

GCV_w is the gross calorific value (cal/g, Btu/lb) of the fuel combusted on an "as received" or "as fired" basis (i.e., the analysis should include the free moisture), determined by the A.S.T.M. test methods D2015-66(72) for solid fuels and D 1826-64(70) for gaseous fuels as applicable.

5. B_{ws}= proportion by volume of water vapor in the ambient air. Approval may be given for determination of B_{ws} by on-site instrumental measurement provided that the absolute accuracy of the measurement technique can be demonstrated to be within ±0.7 percent water vapor. In lieu of actual measurement, B_{ws} may be estimated as follows:

NOTE.—That the following estimating factors are selected to assure that any negative error introduced in the term

$$\left(\frac{20.9}{20.9\ (1 - B_{ws}) - \%O_{2ws}} \right)$$

will not be larger than −1.5 percent. However, positive errors, or over-estimation of emissions, of as much as 5 percent may be introduced depending upon the geographic location of the facility and the associated range of ambient moisture.)

(i) B_{ws}=0.027. This factor may be used as a constant value at any location.

(ii) B_{ws}=highest monthly average of B_{ws} which occurred within a calendar year at the nearest Weather Bureau station.

(iii) B_{ws}=highest daily average of B_{ws} which occurred within a calendar month at the nearest Weather Bureau station, calculated from data for the past three years. This factor shall be calculated for each month and may be used as an estimating factor for the respective calendar month.

b. The following equation may be used for the determination of sulfur dioxide and oxides of nitrogen pollutant emissions from fossil fuel-fired steam generators where the pollutant and oxygen concentrations are measured on a wet basis and the water vapor content of the stack gas is determined at least once every fifteen minutes. When wet scrubbers are employed prior to where the stack gas is sampled or if liquid water droplets or mist is otherwise present in the stack gas, use of a heated extractive monitoring system may collect and vaporize condensed liquid. As a result, the vapor content of the stack gas may be significantly different from the vapor content where the pollutant and oxygen concentrations are measured. Therefore, in all applications of the following equation, the water vapor content must be measured in the monitoring system or stack such that the measured vapor content is the same as the vapor content existing at the point where the pollutant and oxygen measurements are made.

$$E = C_{ws} F \left(\frac{20.9}{20.9(1 - B_{ws}) - \%O_{2ws}} \right)$$

where:

1. E=pollutant emission, g/million cal (lb/million Btu).

2. C_{ws}=pollutant concentration at stack conditions, g/wscm (lb/wscf), determined by multiplying the average concentration (ppm) for each one-hour period by 4.15×10^{-5} M g/wscm per ppm (2.59×10^{-9} M lb/wscf per ppm) where M=pollutant molecular weight, g/g-mole (lb/lb-mole). M=64.07 for sulfur dioxide and 46.01 for nitrogen oxides.

3. $\%_{ws}$=oxygen volume (expressed as percent—wet-basis) determine with equipment specified under paragraph (d) of section 60.45.

4. F=a factor representing a ratio of the volume of dry flue gases generated, to the calorific value of the fuel combusted as specified in section 60.45.

5. $B_{w,}$=proportion by volume of water vapor in the stack gas.

This equation is approved in principle. Approval for actual practice is contingent upon demonstrating the ability to accurately determine $B_{w,}$ such that any absolute error in $B_{w,}$ will not cause an error of more than ±1.5 percent in the term

$$\left(\frac{20.9}{20.9(1-B_{w,})-\%O_{2w,}}\right).$$

Impact of Action on State Implementation Plans

In accordance with regulations promulgated by the Agency on October 6, 1975, States are required to submit regulations that provide for continuous emission monitoring of certain existing sources. Such State regulations shall be submitted to EPA for approval and shall be considered a revision to the approved State Implementation Plan. According to the EPA requirements, States shall set forth performance specifications for monitoring instruments and require that data derived from such monitoring be summarized and made available. Minimum performance standards and other procedures are set forth in 40 CFR Part 51, Appendix P. These requirements allow States to consider alternate procedures when such procedures are determined to be as accurate as those contained within Appendix P.

States are advised that as a result of this notice, EPA now approves the use of two alternate data reduction procedures not currently contained within Appendix P. It should be noted that this action does not mandate acceptance or use of these alternate procedures by any State. This action does, however, signify the Agency's intent to approve State plans employing these data reduction procedures where States determine that such procedures are amendable to their control programs.

Dated: September 30, 1976.

Roger Strelow,
Assistant Administrator
for Air and Waste Management.

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